

**2010-11 WINTER OUTLOOK FOR SOUTHERN SOUTH CAROLINA
AND SOUTHEAST GEORGIA**

December 3, 2010

LOW COUNTRY RESIDENTS MAY REMEMBER THE UNSEASONABLY COLD WINTER OF 2009-10 WHERE SEVERAL LONG STANDING RECORDS WERE EITHER TIED OR BROKEN. LAST WINTER FEATURED THE FIRST SIGNIFICANT ACCUMULATING SNOWFALL IN THE CHARLESTON AND SAVANNAH METROPOLITAN AREAS SINCE 1989. ON FEBRUARY 12, 2010, 1 TO 2 INCHES OF SNOW BLANKETED THE SAVANNAH METROPOLITAN AREA AND 3 TO 5 INCHES OF SNOW FELL ACROSS THE CHARLESTON METROPOLITAN AREA. THE CHARLESTON INTERNATIONAL AIRPORT SET A RECORD FOR THE NUMBER OF CONSECUTIVE DAYS WITH LOW TEMPERATURES AT OR BELOW 30 DEGREES FAHRENHEIT, WITH 13 DAYS IN A ROW ENDING ON JANUARY 14. THIS BROKE THE PREVIOUS RECORD OF 12 CONSECUTIVE DAYS WITH LOW TEMPERATURES AT OR BELOW 30 DEGREES FAHRENHEIT ENDING ON FEBRUARY 4, 1940. AT THE SAVANNAH INTERNATIONAL AIRPORT, THE RECORD FOR CONSECUTIVE DAYS WITH TEMPERATURES AT OR BELOW 30 DEGREES FAHRENHEIT WAS TIED AT 13 DAYS IN A ROW, ENDING JANUARY 14. THE PREVIOUS RECORD OF 13 CONSECUTIVE DAYS WITH LOW TEMPERATURES AT OR BELOW 30 DEGREES FAHRENHEIT ENDED ON FEBRUARY 8, 1966.

A FACTOR WHICH MIGHT HAVE CONTRIBUTED TO THE COLD WEATHER LAST WINTER WAS EL NINO. ACCORDING TO THE NOAA CLIMATE PREDICTION CENTER, EL NINO EPISODES OCCUR WHEN THE THREE MONTH AVERAGE OF SEA SURFACE TEMPERATURE ANOMALIES OVER THE NINO 3.4 REGION IN THE EQUATORIAL CENTRAL PACIFIC OCEAN ARE GREATER THAN OR EQUAL TO 0.5 DEGREES CELSIUS ABOVE NORMAL FOR 5 CONSECUTIVE OVERLAPPING 3 MONTH SEASONS. LA NINA EPISODES ON THE OTHER HAND OCCUR WHEN THE THREE MONTH AVERAGE OF SEA SURFACE TEMPERATURE ANOMALIES OVER THE NINO 3.4 REGION IN THE EQUATORIAL CENTRAL PACIFIC OCEAN ARE GREATER THAN OR EQUAL TO 0.5 DEGREES CELSIUS BELOW NORMAL FOR 5 CONSECUTIVE OVERLAPPING 3 MONTH SEASONS. THE NINO 3.4 REGION IS LOCATED BETWEEN 5 DEGREES NORTH AND 5 DEGREES SOUTH LATITUDE AND BETWEEN 120 DEGREES WEST AND 165 DEGREES WEST LONGITUDE IN THE EQUATORIAL CENTRAL PACIFIC OCEAN AND IS USED BY THE NOAA CLIMATE PREDICITON CENTER IN ITS CALCULATION FOR DETERMINING EL NINO/LA NINA EPISODES. THE AVERAGE SEA SURFACE TEMPERATURE ANOMALIES IN THE NINO 3.4 REGION DURING THE OVERLAPPING 3 MONTH WINTER SEASON DECEMBER THROUGH FEBRUARY WERE 1.7 DEGREES ABOVE NORMAL LAST WINTER (WINTER 2009-10). EL NINO EPISODES CAN CONTRIBUTE TO BELOW NORMAL TEMPERATURES AND ABOVE NORMAL PRECIPITATION ACROSS THE SOUTHEAST UNITED STATES, INCLUDING SOUTH CAROLINA AND GEORGIA, BY STRENGHTENING THE SUBTROPICAL JET STREAM WHICH ALLOWS FOR STRONGER AND MORE FREQUENT STORM SYSTEMS TO MOVE THROUGH THE AREA.

THE FOLLOWING TABLES SHOW AVERAGE DAILY, MAXIMUM AND MINIMUM TEMPERATURES AS WELL AS AVERAGE PRECIPITATION FOR THE MONTHS OF DECEMBER, JANUARY, AND FEBRUARY AT THE CHARLESTON AND SAVANNAH INTERNATIONAL AIRPORTS. FOR COMPARISON PURPOSES, CLIMATOLOGICAL AVERAGES FOR THE SAME CATEGORIES HAVE BEEN INCLUDED FOR ALL WINTER SEASONS IN WHICH EL NINO AND LA NINA EPISODES HAVE BEEN OBSERVED, AS WELL AS FOR LAST WINTER.

CHARLESTON	DEC	JAN	FEB
1950-2010 AVG TEMP	50.6	48.6	51.1
2009-2010 AVG TEMP	50.9	44.5	45.9
DEPARTURE FROM AVG	+0.3	-4.1	-5.2
EL NINO AVG TEMP	51.0	46.2	48.5
LA NINA AVG TEMP	50.6	49.8	52.2

1950-2010 AVG MAX TEMP	61.5	59.3	62.2
2009-2010 AVG MAX TEMP	60.3	54.9	56.4
DEPARTURE FROM AVG	-1.2	-4.4	-5.8
EL NINO AVG MAX TEMP	61.5	56.2	59.2
LA NINA AVG MAX TEMP	62.5	61.0	63.8
1950-2010 AVG MIN TEMP	39.6	37.8	40.0
2009-2010 AVG MIN TEMP	41.6	34.1	35.4
DEPARTURE FROM AVG	+2.0	-3.7	-4.6
EL NINO AVG MIN TEMP	40.5	36.1	37.8
LA NINA AVG MIN TEMP	40.0	39.0	40.7
1950-2010 AVG PRECIP	3.09	3.42	3.12
2009-2010 AVG PRECIP	10.06	6.46	2.61
DEPARTURE FROM AVG	+6.97	+3.04	-0.51
EL NINO AVG PRECIP	4.06	4.44	3.82
LA NINA AVG PRECIP	2.51	2.53	2.63
SAVANNAH	DEC	JAN	FEB
1950-2010 AVG TEMP	51.4	49.4	52.4
2009-2010 AVG TEMP	52.0	45.5	46.3
DEPARTURE FROM AVG	-0.6	-3.9	-6.1
EL NINO AVG TEMP	51.6	47.2	49.8
LA NINA AVG TEMP	52.2	50.4	53.6
1950-2010 AVG MAX TEMP	62.5	60.4	63.7
2009-2010 AVG MAX TEMP	61.6	56.2	57.0
DEPARTURE FROM AVG	-0.9	-4.2	-6.7
EL NINO AVG MAX TEMP	62.3	57.4	60.9
LA NINA AVG MAX TEMP	63.9	62.2	65.7
1950-2010 AVG MIN TEMP	40.3	38.5	41.0
2009-2010 AVG MIN TEMP	42.5	34.8	35.5
DEPARTURE FROM AVG	+2.2	-3.7	-5.5
EL NINO AVG MIN TEMP	41.0	36.9	38.7
LA NINA AVG MIN TEMP	40.8	38.8	41.8
1950-2010 AVG PRECIP	2.87	3.39	2.98
2009-2010 AVG PRECIP	10.71	6.28	3.25
DEPARTURE FROM AVG	+7.84	+2.89	+0.27
EL NINO AVG PRECIP	3.65	4.26	3.64
LA NINA AVG PRECIP	2.63	2.32	2.36

SO, WHAT CAN WE EXPECT ACROSS THE REGION FOR THE WINTER OF 2010-11? THE CLIMATE PREDICTION CENTER EXPECTS THAT LA NINA CONDITIONS WILL DEVELOP AND PERSIST INTO THE SPRING OF 2011. THE EL NINO EPISODE THAT WAS PRESENT OVER THE EQUATORIAL CENTRAL PACIFIC OCEAN BEGAN TO CHANGE BACK IN APRIL AND MAY 2010 WHEN SEA SURFACE TEMPERATURE ANOMALIES BEGAN TO DECREASE ACROSS THE REGION MONITORED FOR EL NINO AND LA NINA EPISODES. THESE SEA SURFACE TEMPERATURE ANOMALIES HAVE CONTINUED TO BECOME MORE NEGATIVE THROUGH THE SUMMER AND INTO THE FALL MONTHS, WITH DEPARTURES IN LATE NOVEMBER AROUND 1.5 DEGREES CELSIUS BELOW NORMAL IN THE NINO 3.4 REGION. THE [CLIMATE PREDICTION CENTER FORECAST FOR WINTER 2010-2011](#) ACROSS THE SOUTHEAST UNITED STATES, INCLUDING SOUTHERN SOUTH CAROLINA AND SOUTHEAST GEORGIA, CALLS FOR WARMER AND DRIER CONDITIONS THAN NORMAL.

TO GET AN IDEA OF WHAT WINTER 2010-11 MAY HAVE IN STORE FOR US LOCALLY IN SOUTHERN SOUTH CAROLINA AND SOUTHEAST GEORGIA, WE HAVE STUDIED TEMPERATURE AND PRECIPITATION ANOMALIES DURING YEARS WHICH TRANSITIONED FROM AN EL NINO EPISODE THE PREVIOUS WINTER TO A LA NINA EPISODE DURING THE WINTER OF INTEREST. USING THE SAME AVERAGING AND DURATION CONSTRAINTS AS MENTIONED ABOVE TO CLASSIFY EL NINO AND LA NINA EPISODES, WE FURTHER CHARACTERIZED A STRONG EL NINO EPISODE TO OCCUR WHEN SEA SURFACE TEMPERATURE ANOMALIES ARE GREATER THAN 1.0 DEGREES CELSIUS ABOVE NORMAL AND A STRONG LA NINA EPISODE TO OCCUR WHEN SEA SURFACE TEMPERATURE ANOMALIES ARE GREATER THAN 1.0 DEGREES CELSIUS BELOW NORMAL. WE TARGETED WINTER SEASONS FEATURING A TRANSITION FROM A STRONG EL NINO EPISODE THE PRIOR WINTER TO A STRONG LA NINA EPISODE DURING THE WINTER OF INTEREST, BECAUSE THIS IS WHAT IS PREDICTED TO OCCUR THIS WINTER BY MANY OF THE GLOBAL CLIMATE MODELS AS WELL AS THE CLIMATE PREDICITON CENTER.

FOR THE UPCOMING METEOROLOGICAL WINTER SEASON, DECEMBER 2010 THROUGH FEBRUARY 2011, MOST GLOBAL CLIMATE MODELS SUGGEST THAT SEA SURFACE TEMPERATURE ANOMALIES OVER THE EQUATORIAL CENTRAL PACIFIC OCEAN WILL HOVER BETWEEN 1.5 AND 2.0 DEGREES BELOW WHERE THEY WOULD TYPICALLY BE FOR THAT TIME OF YEAR. THERFORE, BASED ON THIS THINKING, THIS WINTER WILL BE UNDER THE INFLUENCE OF A STRONG LA NINA EPISODE WHICH HAS TRANSITIONED FROM A STRONG EL NINO EPISODE LAST WINTER. BELOW IS A SERIES OF TABLES SHOWING THE AVERAGE DAILY, MAXIMUM AND MINIMUM TEMPERATURES FOR TRANSITIONAL YEARS FROM AN EL NINO EPISODE TO A LA NINA EPISODE REGARDLESS OF THE STRENGTH OF EITHER EPISODE.

THE FOLLOWING STATISTICS ARE AVERAGES OF ALL THE WINTERS FROM 1950-2010 CHARACTERIZED BY A TRANSITION FROM AN EL NINO EPISODE THE PREVIOUS WINTER TO A LA NINA EPISODE DURING THE WINTER OF INTEREST, REGARDLESS OF THE STRENGTH OF THE EL NINO OR LA NINA EPISODE. (LA NINA TRANSITION YEARS - 1964/65, 1970/71, 1973/74, 1988/89, 1995/96, 1998/99, 2007/08).

CHARLESTON	DEC	JAN	FEB
1950-2010 AVG TEMP	50.6	48.6	51.1
LA NINA TRANSITION YEARS	52.4	52.3	52.6
DEPARTURE FROM AVG	+1.8	+3.7	+1.5
1950-2010 AVG MAX TEMP	61.5	59.3	62.2
LA NINA TRANSITION YEARS	63.6	63.3	64.3
DEPARTURE FROM AVG	+2.1	+4.0	+2.1
1950-2010 AVG MIN TEMP	39.6	37.8	40.0
LA NINA TRANSITION YEARS	41.3	41.3	40.8
DEPARTURE FROM AVG	+1.7	+3.5	+0.8
1950-2010 AVG PRECIP	3.09	3.42	3.12
LA NINA TRANSITION YEARS	2.99	2.85	2.92
DEPARTURE FROM AVG	-0.10	-0.57	-0.20

SAVANNAH	DEC	JAN	FEB
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1950-2010 AVG TEMP	51.4	49.4	52.4
LA NINA TRANSITION YEARS	53.2	53.0	54.1
DEPARTURE FROM AVG	+1.8	+3.6	+1.7
1950-2010 AVG MAX TEMP	62.5	60.4	63.7
LA NINA TRANSITION YEARS	64.7	64.8	66.4
DEPARTURE FROM AVG	+2.2	+4.4	+2.7
1950-2010 AVG MIN TEMP	40.3	38.5	41.0
LA NINA TRANSITION YEARS	41.7	41.2	41.8
DEPARTURE FROM AVG	+1.4	+2.7	+0.8
1950-2010 AVG PRECIP	2.87	3.39	2.98
LA NINA TRANSITION YEARS	3.49	2.25	2.61
DEPARTURE FROM AVG	+0.62	-1.14	-0.37

THE FOLLOWING STATISTICS ARE AVERAGES OF ALL THE WINTERS FROM 1950-2010 CHARACTERIZED BY A TRANSITION FROM A STRONG EL NINO EPISODE THE PREVIOUS WINTER TO A STRONG LA NINA EPISODE DURING THE WINTER OF INTEREST.
(STRONG LA NINA TRANSITION YEARS 1964/65, 1973/74, 1988/89, 1998/99, 2007/08).

CHARLESTON	DEC	JAN	FEB
1950-2010 AVG TEMP	50.6	48.6	51.1
STRONG LA NINA TRANSITION	53.5	53.6	53.3
DEPARTURE FROM AVG	+2.9	+5.0	+2.2
1950-2010 AVG MAX TEMP	61.5	59.3	62.2
STRONG LA NINA TRANSITION	64.3	64.7	64.9
DEPARTURE FROM AVG	+2.8	+5.4	+2.7
1950-2010 AVG MIN TEMP	39.6	37.8	40.0
STRONG LA NINA TRANSITION	42.7	42.6	41.7
DEPARTURE FROM AVG	+3.1	+4.8	+1.7
1950-2010 AVG PRECIP	3.09	3.42	3.12
STRONG LA NINA TRANSITION	3.41	2.69	2.87
DEPARTURE FROM AVG	+0.32	-0.73	-0.25
SAVANNAH	DEC	JAN	FEB
1950-2010 AVG TEMP	51.4	49.4	52.4
STRONG LA NINA TRANSITION	53.7	54.2	54.3
DEPARTURE FROM AVG	+2.3	+4.8	+1.9
1950-2010 AVG MAX TEMP	62.5	60.4	63.7
STRONG LA NINA TRANSITION	65.0	65.9	66.6
DEPARTURE FROM AVG	+2.5	+5.5	+2.9
1950-2010 AVG MIN TEMP	40.3	38.5	41.0

STRONG LA NINA TRANSITION	42.3	42.4	42.1
DEPARTURE FROM AVG	+2.0	+3.9	+1.1
1950-2010 AVG PRECIP	2.87	3.39	2.98
STRONG LA NINA TRANSITION	4.03	2.06	2.86
DEPARTURE FROM AVG	+1.16	-1.33	-0.12

THE TABLES ABOVE SHOW A STRONG CORRELATION BETWEEN A WINTER CHARACTERIZED BY A TRANSITION FROM AN EL NINO EPISODE THE PRIOR WINTER TO LA NINA EPISODE DURING THE WINTER OF INTEREST, WITH ABOVE AVERAGE TEMPERATURES AND SLIGHTLY BELOW AVERAGE PRECIPITATION TOTALS. THE CORRELATION IS EVEN GREATER IN WINTERS CHARACTERIZED BY A TRANSITION FROM A STRONG EL NINO EPISODE TO A STRONG LA NINA EPISODE. ALTHOUGH THERE HAVE ONLY BEEN 5 WINTERS SINCE 1950 WHICH FALL INTO THIS CATEGORY, THE CORRELATION WITH ABOVE AVERAGE TEMPERATURES DURING THE WINTER MONTHS IS STATISTICALLY STRONG FOR EACH WINTER IN WHICH THIS HAS BEEN OBSERVED SINCE RECORDS OF SEA SURFACE TEMPERATURE ANOMALIES IN THE EQUATORIAL CENTRAL PACIFIC OCEAN HAVE BEEN KEPT (DATING BACK TO 1950), AND PARTICULARLY STRONG DURING THE MONTH OF JANUARY. THE CORRELATION BETWEEN A WINTER CHARACTERIZED BY A TRANSITION FROM AN EL NINO EPISODE TO A LA NINA EPISODE AND THE AMOUNT OF PRECIPITATION IS NOT NEARLY AS GREAT, REGARDLESS OF THE STRENGTH OF THE TRANSITION FROM AN EL NINO EPISODE TO A LA NINA EPISODE.

BASED ON THE CORRELATIONS FOUND IN THE RESEARCH EXAMINING WINTERS CHARACTERIZED BY A TRANSITION FROM A STRONG EL NINO TO A STRONG LA NINA, THE REGION HAS A BETTER THAN 50% CHANCE OF EXPERIENCING ABOVE AVERAGE TEMPERATURES DURING THE WINTER OF 2010-11 AND A GREATER THAN 50% CHANCE OF OBSERVING BELOW AVERAGE PRECIPITATION, WHICH IS CONSISTENT WITH THE WINTER OUTLOOK ISSUED BY THE CLIMATE PREDICTION CENTER. THE RESEARCH ALSO INDICATES THAT THE MONTH OF JANUARY MAY BE MORE NOTICEABLY ABOVE AVERAGE THAN THE OTHER WINTER MONTHS OF DECEMBER AND FEBRUARY. DESPITE THE RESEARCH INDICATING THE POSSIBILITY FOR ABOVE AVERAGE TEMPERATURES DURING THE WINTER MONTHS OF DECEMBER THROUGH FEBRUARY, PERIODS OF COLD WEATHER AND BELOW AVERAGE TEMPERATURES WILL LIKELY AFFECT THE AREA, BUT THE DURATION OF THE COLD SPELLS AND BELOW AVERAGE TEMPERATURES WILL LIKELY BE OF SHORTER DURATION THAN THOSE EXPERIENCED DURING THE WINTER OF 2009-10.

THE FOLLOWING TABLES OUTLINE THE MONTHLY AVERAGE, MAXIMUM, AND MINIMUM TEMPERATURES AS WELL AS THE MONTHLY PRECIPITATION IN CHARLESTON AND SAVANNAH FOR THE 5 WINTERS SINCE 1950 CHARACTERIZED BY A TRANSITION FROM A STRONG EL NINO TO A STRONG LA NINA, AND MAY GIVE AN INDICATION OF WHAT CAN BE EXPECTED ACROSS THE REGION DURING THE WINTER OF 2010-11.

CHARLESTON	DEC	JAN	FEB
1964-1965			
AVG TEMP	52.9	48.3	51.2
AVG MAX TEMP	62.7	60.8	61.8
AVG MIN TEMP	43.0	35.9	40.6
AVG PRECIP	3.01	1.69	5.49
1973-1974			
AVG TEMP	51.3	61.8	51.5
AVG MAX TEMP	62.1	70.9	63.5
AVG MIN TEMP	40.5	52.7	39.4

AVG PRECIP	4.58	1.42	2.96
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1988-1989

AVG TEMP	50.6	55.6	55.0
AVG MAX TEMP	62.1	66.0	65.7
AVG MIN TEMP	39.0	45.2	44.3
AVG PRECIP	0.72	2.31	1.17

1998-1999

AVG TEMP	55.7	53.6	53.6
AVG MAX TEMP	65.8	66.1	65.9
AVG MIN TEMP	45.6	41.0	41.3
AVG PRECIP	4.34	4.96	2.01

2007-2008

AVG TEMP	57.0	48.9	55.2
AVG MAX TEMP	68.6	59.5	67.7
AVG MIN TEMP	45.3	38.3	42.8
AVG PRECIP	4.39	3.07	2.72

SAVANNAH	DEC	JAN	FEB
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1964-1965

AVG TEMP	53.7	49.9	52.4
AVG MAX TEMP	64.5	63.8	64.0
AVG MIN TEMP	42.8	36.0	40.8
AVG PRECIP	4.16	0.83	4.34

1973-1974

AVG TEMP	51.2	62.9	52.9
AVG MAX TEMP	62.7	72.7	65.8
AVG MIN TEMP	39.6	53.1	40.1
AVG PRECIP	3.26	1.37	2.79

1988-1989

AVG TEMP	51.1	56.5	56.1
AVG MAX TEMP	63.5	67.9	67.3
AVG MIN TEMP	38.7	45.2	44.9
AVG PRECIP	0.99	0.45	0.67

1998-1999

AVG TEMP	50.6	48.4	51.0
AVG MAX TEMP	66.0	66.0	67.1
AVG MIN TEMP	45.0	38.7	41.5
AVG PRECIP	2.32	4.73	1.95

2007-2008

AVG TEMP	56.9	49.1	56.0
AVG MAX TEMP	68.4	59.1	69.0
AVG MIN TEMP	45.3	39.0	43.0
AVG PRECIP	9.44	2.93	4.55